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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,842	11/12/2003	Paul S. Andry	YOR920010100US2 (8728-493)	6927
22150	7590	10/12/2006	EXAMINER	
F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797			HON, SOW FUN	
			ART UNIT	PAPER NUMBER

1772

DATE MAILED: 10/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/706,842	ANDRY ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Sow-Fun Hon	1772	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 15-19 and 21-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-19 and 21-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/17/06 has been entered

### ***Response to Amendment***

#### ***Withdrawn Rejections***

2. The objection to claim 25 under 37 CFR 1.75(c) is withdrawn due to Applicant's amendment dated 7/17/06.

3. The 35 U.S.C. 102(b) and 103(a) rejections of claims 1-19, 21-25 are withdrawn due to Applicant's amendment dated 7/17/06.

#### ***New Rejections***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 112***

4. Claim 19 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There does not appear to be a tilted homeotropic liquid crystal material present in the alignment layer described in the specification.

***Claim Rejections - 35 USC § 102***

5. Claims 15, 18, 21, 24, 26-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaganowicz (US 5,013,139).

Regarding claim 15, Kaganowicz (Kag139) teaches a liquid crystal display device, comprising: an alignment layer comprising constituent materials (column 2, lines 53-62), and liquid crystal material in contact with the alignment layer (liquid crystal material 11, column 3, lines 3-5, alignment layer 16, 17, line 25-26, Fig. 1), wherein the product of the constituent materials, which is the alignment layer, imparts a predetermined pretilt angle to the liquid crystal material (providing the desired molecular alignment and good tilt angle, column 3, lines 30-32). Thus the stoichiometric ratio of the constituent materials in the alignment layer, which is the product of the constituent materials, imparts a predetermined pretilt angle to the liquid crystal material.

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Regarding claim 18, Kag139 teaches that the alignment layer includes carbon (column 3, lines 30-40) which is a constituent material having Pi-electrons as defined by Applicant's specification (page 11, lines 4-10).

Regarding claim 21, Kag139 teaches a liquid crystal display device, comprising: an alignment layer comprising constituent materials (column 2, lines 53-62), and liquid crystal material in contact with the alignment layer (liquid crystal material 11, column 3, lines 3-5, alignment layer 16, 17, line 25-26, Fig. 1), wherein the product of the constituent materials, which is the alignment layer, imparts a predetermined pretilt angle to the liquid crystal material (providing the desired molecular alignment and good tilt angle, column 3, lines 30-32). Kag139 teaches that the amount of carbon in the alignment layer starts at 40% (column 3, lines 30-40), which imparts a starting, or preexisting pretilt angle provided by the starting, or preexisting alignment layer (providing the desired molecular alignment and good tilt angle, column 3, lines 30-32). Thus the stoichiometric ratio of the constituent materials in the starting, or preexisting alignment layer, which is the product of the constituent materials, imparts a preexisting pretilt angle to the liquid crystal material. Kag139 teaches that the amount of carbon can be increased up to 85% (column 3, lines 30-40), wherein the additional amount of the carbon imparts a predetermined pretilt angle to the liquid crystal material which is different than the starting, or preexisting pretilt angle provided by the starting, or preexisting alignment layer, as defined by Applicant's specification (Depending on the relative composition of the carbon atoms to the other atoms, the alignment varies from homogeneous to homeotropic, page 11, lines 5-10).

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Regarding claim 24, Kag139 teaches a liquid crystal display device, comprising: an alignment layer comprising a first material N and a second material C (nitrogen, carbon, column 2, lines 53-62), and liquid crystal material in contact with the alignment layer (liquid crystal material 11, column 3, lines 3-5, alignment layer 16, 17, line 25-26, Fig. 1), wherein the second material C imparts a homogeneous alignment in the liquid crystal material, as defined by Applicant's specification (the alignment varies from homogeneous for carbon, due to the Pi-Pi interaction of the carbon atoms, page 11, lines 4-10) and the first material N imparts a homeotropic alignment in the liquid crystal material, as defined by Applicant's specification (the Pi-Pi interaction due to carbon atoms will compete with van der Waals interaction which arises from atoms such as N which do not form Pi bonds, page 11, lines 4-10, Depending on the relative composition of the carbon atoms to the other atoms, the alignment varies from homogeneous to homeotropic, page 11, lines 5-10), and the second material is in an amount to impart a predetermined pretilt angle to the liquid crystal material since the product of the constituent materials is the resultant alignment layer (providing the desired molecular alignment and good tilt angle, column 3, lines 30-32).

Regarding claims 26-30, Kag139 teaches that the pretilt angle is achieved without rubbing (optimum molecular alignment, tilt angle are obtained in one step process, column 3, lines 40-43), and hence achieved solely by the stoichiometric ratio of the product of the constituent materials of the resultant alignment layer.

6. Claims 15, 17, 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaganowicz (US 5,011,268).

Regarding claim 15, Kaganowicz (Kag268) teaches a liquid crystal display device, comprising: an alignment layer comprising constituent materials (column 2, lines 54-60) and liquid crystal material 11 in contact with alignment layer 16 (column 3, lines 10-20, Fig. 1). Kag268 teaches that the product of the constituent materials, which is the resultant alignment layer, imparts a predetermined pretilt angle to the liquid crystal material (yields alignment layers which have the required tilt angle, column 3, lines 26-30). Thus the stoichiometric ratio of the constituent materials in the alignment layer, which is the product of the constituent materials, imparts a predetermined pretilt angle to the liquid crystal material.

Regarding claim 17, Kag268 teaches that the alignment layer includes silicon oxynitride (column 3, lines 60-65).

Regarding claim 19, Kag268 teaches that the alignment layer includes  $\text{SiO}_x$  (silicon oxide, column 4, lines 47-48), which provides a homeotropic alignment layer, as defined by Applicant's specification (page 10, lines 5-10). Kag268 teaches that the material provides a tilt angle (column 3, lines 15-20), which means that the alignment layer, which is the product of the constituent materials, includes a constituent material which provides a tilted homeotropic alignment to the liquid crystal material, consistent with the disclosure of the original specification (page 10, lines 5-10).

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 22-23, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kag139 as applied to claims 15, 18, 21, 24, 26-30 above, and further in view of Chaudhari (US 6,195,146).

Kag139 teaches the liquid crystal display device comprising an alignment layer comprising constituent materials having a stoichiometric ratio that imparts a predetermined pretilt angle, as discussed above, but fails to teach that the alignment layer had ions directed at it to provide uniformity of the predetermined pretilt angle.

However, Chaudhari teaches a liquid crystal display device wherein ion-beam irradiation (exposure, column 1, lines 15-20) is directed at the alignment layer (column 2, lines 15-25), for the purpose of providing stability and uniformity to the pretilt angle (consistency, column 1, lines 55-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have directed ions at the alignment layer of Kag139, in order to provide stability and uniformity of the pretilt angle, as taught by Chaudhari.

8. Claims 16, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kag268 as applied to claims 15, 17, 19 above, and further in view of Onuma (US 5,353,141).

Kag268 teaches the liquid crystal display device comprising an alignment layer comprising constituent materials having a stoichiometric ratio that imparts a



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predetermined pretilt angle, as discussed above. In addition, Kag268 teaches that the constituent materials of the alignment layer comprise the silicon and nitrogen constituents of  $\text{SiN}_x$  (silicon nitride, column 3, lines 45-53), but fails to teach that the alignment layer includes  $\text{SiC}_x$  wherein  $x$  provides the stoichiometric relationship.

However, Onuma teaches that  $\text{SiC}_x$  can be used instead of silicon nitride (silicon carbide, silicon nitride, column 7, lines 1-3) as the inorganic alignment layer (column 6, lines 67-68) for the purpose of utilizing its physical properties. The carbon constituent of  $\text{SiC}_x$  has Pi-electrons as defined by Applicant's specification (page 11, lines 5-15) and  $x$  provides a stoichiometric relationship, which allows the  $\text{SiC}_x$  to exist in stable form.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used  $\text{SiC}_x$  in place of the  $\text{SiN}_x$  in the alignment layer of Kag268, wherein  $x$  provides a stable stoichiometric ratio, in order to provide an alignment layer with the desired pretilt angle, utilizing the physical properties of  $\text{SiC}_x$ , as taught by Onuma.

### ***Response to Arguments***

9. While the prior rejections are withdrawn due to Applicant's amendments resulting in the new grounds of rejection, Applicant's arguments regarding Kag268 (US 5,011,268), as the primary reference, are addressed below in order to advance prosecution.

10. Applicant argues that Kag268 fails to teach a predetermined pretilt angle imparted by a stoichiometric ratio.

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Applicant is respectfully apprised that Kag268 teaches that the product of the constituent materials, which is the resultant alignment layer, imparts a predetermined pretilt angle to the liquid crystal material (yields alignment layers which have the required tilt angle, column 3, lines 26-30). Thus the stoichiometric ratio of the constituent materials in the alignment layer, which is the product of the constituent materials, does impart a predetermined pretilt angle to the liquid crystal material.

11. Applicant argues that even if the alignment layer of Kag268 has an effect on the pretilt angle, the pretilt angle is not predetermined.

Applicant is respectfully apprised that Kag268 teaches that the alignment layer has the required pretilt angle (column 3, lines 26-30). A requirement is a predetermination. Regarding the other prior art used, a desired angle is also a predetermined angle.

12. The arguments against Onuma and Chaudhari are directed against the valid use of Kag268 as a primary reference, and have been addressed above.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571) 272-1498. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*S. Hon*

Sow-Fun Hon

*10/02/06*